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ABSTRACT OF THE DISCLOSURE

5 An InGaAs/InAlAs-based avalanche photodetector provides high gain and high bandwidth over a range of operating biases. A graded transition region alleviates the barrier to electron transport from the absorption region to the multiplication region when an operating bias is applied. The graded transition region is a graded bandgap material with a relatively wide bandwidth in the region closer to the multiplication region and a relatively narrow bandgap in the region closer to the  
10 absorption region. In another embodiment, a p-type dopant profile is introduced within the absorption layer to produce an electrostatic field which accelerates electrons towards the multiplication region. In another embodiment, a bi-level multiplication region with a wide bandgap ternary layer and a narrower bandgap quarternary layer is provided at an increased thickness to improve gain per unit  
15 length.

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